

# PATENT ABSTRACTS OF JAPAN

(11)Publication number : 06-230368

(43)Date of publication of application : 19.08.1994

(51)Int.CI.

G02F 1/1335  
G02B 5/30

(21)Application number : 05-014919

(71)Applicant : SEIKO EPSON CORP

(22)Date of filing : 01.02.1993

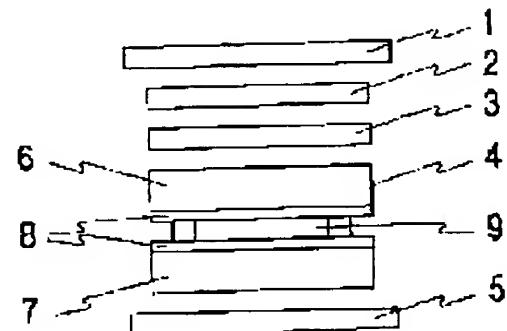
(72)Inventor : OKUMURA OSAMU

## (54) PHASE DIFFERENCE PLATE AND LIQUID CRYSTAL DISPLAY DEVICE FORMED BY USING THE SAME

### (57)Abstract:

**PURPOSE:** To provide the liquid crystal display device which has a wide visual angle and is less colored by using such phase difference plates that make a double refractive index zero at a certain wavelength of visible light.

**CONSTITUTION:** This liquid crystal display device is constituted of an upper polarizing plate 1, the first phase difference plate 2, the second phase difference plate 3, a liquid crystal cell 4, a lower polarizing plate 5 and an upper substrate 6, lower substrate 7, transparent electrodes 8 and nematic liquid crystal 9 of the liquid crystal cell. A PC (polycarbonate) film of  $2.00 \mu\text{m}$  retardation to 589nm light is used for the first phase difference plate 2 and a PMMA (polymethyl methacrylate) film likewise of  $2.02 \mu\text{m}$  is used for the second phase difference plate 3. The PC film is higher in the dependency of the refractive index on wavelength than the PMMA film. The phase difference plate which makes the retardation zero exactly at 550nm is obtd. if both are laminated by unifying uniaxial stretching axes. The PC is positive in photoelastic constant and conversely the PMMA is negative. This combination is more advantageous in terms of visual angle characteristic than the combination of positive and positive or negative and negative.



### LEGAL STATUS

[Date of request for examination] 31.01.2000

[Date of sending the examiner's decision of rejection]

[Kind of final disposal of application other than the examiner's decision of rejection or application converted registration]

[Date of final disposal for application]

[Patent number] 3206177

[Date of registration] 06.07.2001

[Number of appeal against examiner's decision of rejection]

[Date of requesting appeal against examiner's decision of rejection]

[Date of extinction of right]